

Architecture,
Architectural
Technology and
Landscape
Architecture

Subject benchmark statements

Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programmes in a specific subject. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.

This subject benchmark statement, together with the others published concurrently, refers to the ***bachelors degree with honours***.

Subject benchmark statements are used for a variety of purposes. Primarily, they are an important external source of reference for higher education institutions when new programmes are being designed and developed in a subject area. They provide general guidance for articulating the learning outcomes associated with the programme but are not a specification of a detailed curriculum in the subject. Benchmark statements provide for variety and flexibility in the design of programmes and encourage innovation within an agreed overall framework.

Subject benchmark statements also provide support to institutions in pursuit of internal quality assurance. They enable the learning outcomes specified for a particular programme to be reviewed and evaluated against agreed general expectations about standards.

Finally, subject benchmark statements are one of a number of external sources of information that are drawn upon for the purposes of academic review* and for making judgements about threshold standards being met. Reviewers do not use subject benchmark statements as a crude checklist for these purposes however. Rather, they are used in conjunction with the relevant programme specifications, the institution's own internal evaluation documentation, together with primary data in order to enable reviewers to come to a rounded judgement based on a broad range of evidence.

The benchmarking of academic standards for this subject area has been undertaken by a group of subject specialists drawn from and acting on behalf of the subject community. The group's work was facilitated by the Quality Assurance Agency for Higher Education, which publishes and distributes this statement and other benchmarking statements developed by similar subject-specific groups.

The statement represents the first attempt to make explicit the general academic characteristics and standards of an honours degree in this subject area, in the UK.

In due course, but not before July 2003, the statement will be revised to reflect developments in the subject and the experiences of institutions and academic reviewers who are working with it. The Agency will initiate revision and, in collaboration with the subject community, will establish a group to consider and make any necessary modifications to the statement.

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* academic review in this context refers to the Agency's new arrangements for external assurance of quality and standards. Further information regarding these may be found in the ***Handbook for Academic Review***, which can be found on the Agency's web site.

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Foreword

The subject benchmark group for Architecture, Architectural Technology and Landscape Architecture consisted of members representing each of the subjects within Higher Education in the UK.

The group met as a whole initially to address the benchmark issues. However, the deliberations on the form and content of benchmarking statements for these three subject areas were carried out independently by respective specialist subgroups. This form of working was supported by QAA.

The three subgroups produced separate benchmark statements for Architecture, Architectural Technology and Landscape Architecture.

The reasons for such separation are the different aims, structures and content of undergraduate provision in each of the subjects.

The Landscape Architecture statement is not included in the main body of this document but is available as a supplement from QAA.

May 2000

Academic standards - Architecture

1.0 Introduction

This benchmark addresses first degrees in architecture, most of which offer, or might wish to offer, exemption from the first part of the examination for professional qualification. We have sought, however, to delineate the discipline's boundaries so as to allow undergraduate awards in architecture to embrace a broad constituency, insisting on a sense of intellectual enquiry beyond the professional practice of the subject. This document encourages individual schools to describe the territory within which they locate themselves. It is not intended as a curriculum.

The act of building is as old as that of settlement, but the post-classical articulation of architecture as an intellectual discourse began during the Italian Renaissance. As a discipline, architecture is typically understood as concerned with the planning, design and production of buildings, parts of buildings and collections of buildings. These will either exist already, and require conservation or modification, or will be newly developed. But in its fullest sense, architecture is enmeshed in the design and construction of things and spaces in response to various constituencies or users. This may include a piece of furniture, a virtual environment, a landscape, or on a larger scale, the design of rural, suburban or urban environments.

Collective professional bodies were first organised in Britain in the 19th century in response to an increasingly complex, industrialising world. These bodies began to establish a codified corpus of knowledge and methods of practice for each discipline. In architecture it also involved an assumption of the role of protecting the building client and the title and status of architect. These processes became enshrined in statute in the 1930s. The education of architects at the time was *ad hoc*, and largely took the form of office based tutelage. Concurrently, British architectural education was growing within the existing forms of higher education. The past 40 years have seen it become firmly embedded in the university structure, helping to make explicit the distinction between architectural education and architectural practice. It is for this reason that this document sets out a benchmark standard for undergraduate architecture courses whether they are professionally recognised or not.

The professional and statutory validation of courses, programmes and awards in the UK is carried out jointly by the Royal Institute of British Architects (RIBA), alongside the Royal Incorporation of Architects of Scotland and the Royal Society of Ulster Architects (RSUA) in these countries, and the Architects Registration Board (ARB). In the academic session 1999-2000 there were 35 validated first degree programmes, and a small number of candidate courses for validation. In order to be registered as an architect, one must typically study three years full time (or its equivalent) for Part 1 exemption; two years full time (or its equivalent) for Part 2 exemption; amass a minimum of two years of monitored practical training and pass an examination in professional practice for the final Part 3 exemption. The majority of undergraduate courses in Britain which adopt Part 1 or associated named awards carry both a professional qualification and award an undergraduate degree. If they carry Part 1 exemption, they are required to undergo professional accreditation as well as subject review, given that the responsibilities for the monitoring and upholding of professional standards lies with the professional bodies.

In preparing the benchmark statement for architecture, we have embraced the breadth to the discipline while also recognising the threshold standard for professional validation. Our starting points have been the European Commission Architecture Directive (1985), the outline syllabus for Part 1 described by the Joint Validation Panel documents (1997), the RIBA Examination in Architecture for Office Based Candidates (1997), the Stansfield Smith Review of architectural education (1999), the Latham and Egan Reports on the construction industry (1997,8), the Dearing Report on higher education (1997), and the Rogers Report of the Urban Task Force (1999). We have also consulted QAA benchmark statements for first degrees in other subjects, recognising that some of them will impinge upon and overlap with the subject of architecture.

2.0 Description of the subject

The discipline of architecture draws on knowledge and skills from the human and physical sciences, the humanities, and the fine and applied arts. It addresses the accommodation of all human activity in all places under all conditions, understanding our place within differing physical, historical, cultural, social, political and virtual environments. Architecture proposes, forms, and transforms our built environment, and does so through an engagement with the spaces, buildings, cities and landscapes in which we live. Architectural education is therefore rich, varied and by definition interdisciplinary.

Design is the core activity of an architectural education. There is, however, no single, unified theory of design which is generally accepted. Indeed it is the contested nature of design as an activity that provokes debate, encourages diversity, and advances the subject. Nor is design a single category of activity. The relationship among design process, design programme and design projects raises issues of how projects can be developed, communicated, received, criticised and realised. It is the interaction of ideas, intentions and operations that gives the core of the subject area its distinctiveness, and allows universities the opportunity for diversity in their delivery of undergraduate courses. This is amplified by the other parts of the teaching programme to provide a broad education which supports design, and which invariably emphasise some subjects over others consonant with that school's (or even teaching group's) interpretation of design.

Students entering architecture courses have, in general, little or no experience of design or other key subjects. Many areas of study are thus being introduced for the first time. This has, however, many benefits. Students tend to come to architectural education from numerous backgrounds, bringing to the schools the very diversity of disciplines and modes of inquiry that an architecture course requires and imbues. Most people studying architecture at degree level do so with the intention of pursuing a route which will lead to professional accreditation, or to a career in a related field. Architectural education is a part of the construction industry, and along with architecture practice, has an important role to play in how this industry changes and develops. But the knowledge, understanding and skills that an architecture education imparts is broad, holistic and of value in itself, as befits a distinct, academic discipline. Students awarded a degree in architecture may go on to work in a number of fields.

3.0 Knowledge, understanding and skills

Architecture requires inquiry and synthesis, and brings to bear a wide range of knowledge, understanding and skills. It involves a complex sequence of research, reflection, iteration and integration of specific subject-based knowledge, with the aim of applying these to a design project. Architecture draws together conceptual, contextual, ethical and material considerations in the realisation of space or form.

3.1 Subject-specific knowledge, understanding and skills

The subject-specific knowledge, understanding and skills attained during an architectural degree can be grouped into the following interrelated five headings:

3.1.1 Design

The design project will be informed by an understanding of the ways that architectural histories and theories, and the existing physical and cultural context, can inform design processes, programmes and proposals.

The student will have a knowledge and understanding of the principles of building technologies, including the application of structure, construction, materials and environmental design in relation to human needs.

The student will understand and appreciate the impact on design of regulatory frameworks, the needs and aspirations of clients or users, the roles of those who collaborate in the making process and the impact of the design upon the wider community.

The student will understand and appreciate the importance of communication and dialogue in the development and discussion of design ideas.

Design-specific skills are:

- an ability to conceptualise, investigate and develop the design of three-dimensional objects and spaces
- an ability to create architectural designs that integrate social, aesthetic and technical requirements

- an ability to conceive architectural designs on a specific site within the broader landscape and context of urban planning
- an ability to research, formulate and respond to programmes or briefs that are appropriate to specific contexts and circumstances
- an ability to work in an interdisciplinary environment and collaborate with others

3.1.2 Cultural context

The cultural context of architecture is centred on the histories and theories of architecture and urban design, the history of ideas, and the related disciplines of art, cultural studies and landscape studies.

The student will recognise and appreciate the influences on the contemporary built environment of individual buildings, the design of cities, past and present societies and wider, global issues.

Culture-specific skills are:

- an ability to form considered judgments about the spatial, aesthetic, technical and social qualities of a design within the scope and scale of a wider environment
- an ability to reflect upon and relate their ideas to a design and to the work of others

3.1.3 Environments and technologies

Architectural design requires a knowledge and understanding of the theories and principles of environmental technologies, and an awareness of their impact upon human comfort, well-being and protection. It requires an understanding of the relationship of these to the climate, the development of a sustainable environment, and the impact that design decisions may have upon the natural world and its resources.

The processes of design demand knowledge and understanding of structural and constructional principles, the properties and meanings of materials, and the ways that these may inform and influence design decisions.

Similarly, design requires an appreciation of the impact of statutory instruments for health, safety and comfort, both during the construction and subsequent occupation of a project.

Environment/technology-specific skills are:

- an ability to produce designs that demonstrate the integrative relationship of structure, building materials and constructional elements
- an ability to produce designs that demonstrate an understanding of the integrative relationship between climate, service systems and energy supply
- an ability to exercise informed and reflective judgment in the development of sustainable design

3.1.4 Communication

In order to develop design ideas, communicate them to others, listen and respond to feedback, whether in informal or formal groups, it is important for the student to have a knowledge and understanding of the breadth of graphic and modelling techniques within a wide range of media. It is also necessary to have the ability to select the appropriate medium, and to be proficient in verbal and graphic techniques.

Communication-specific skills are:

- an ability to understand the conventions of architectural representation
- an ability to use a range of visual, written and verbal techniques in order to communicate architectural designs and ideas
- an ability to select and use various media in order to communicate to the intended interest group
- an ability to select and use design using design-based software and multimedia applications
- an ability to listen and engage in informed dialogue

3.1.5 Professional studies

Professional studies provide an appreciation of the issues and constituencies which influence the processes and delivery of design; for instance, the relationships of those in the construction, culture and other industries, and the ways that regulatory frameworks and systems relate to wider social and ethical concerns.

Professional-specific skills are:

- an ability to work collaboratively within an interdisciplinary environment
- an ability to respond to a broad constituency of interests and to the social and ethical concerns of the subject

3.2 Transferable skills

As well as the above list of subject-specific knowledge, understanding and skills, an undergraduate course in architecture engenders a broad range of transferable skills. These include the ability to:

- communicate effectively with other people using visual, graphic, written and verbal means
- work autonomously in a self-directed manner, thereby developing the practices of reflection and of lifelong learning
- work in teams
- manage time and work to deadlines
- use digital and electronic communication techniques
- analyse problems, and use innovation, logical and lateral thinking in their solution
- be flexible and adaptable in the approach to and development of an issue, problem or opportunity

4.0 Teaching and learning

The methods and contexts of learning in architectural education are distinguished by the central role of the design project, the specificity of the design process, the profusion of accepted design approaches, and the importance and variety of effective means of communication. Architectural education does employ the usual teaching processes of lectures and seminars, but it is at heart project-oriented. It balances the creative process with a critical awareness of more objective criteria in the development of a proposition. Each design outcome tends to be unique, non-repetitive and immanent in its conception and development.

Architecture students learn from the outset to synthesise a variety of information, approaches, interpretations, facts and disciplines, bringing them to bear on the design project. Students thus need to learn and retain knowledge and understanding from more conventionally academic disciplines that are linked to the humanities and to the physical and human sciences. However like design, the coursework in these areas is often investigative, speculative and creative in intent while developing core skills.

4.1 The design studio

The core activity of architectural design is taught through a combination of individual tutorials, group tutorials, semi-public and public presentations (known as project reviews or crits), and arrangements where students work and discuss things together formally and informally. The nature of the discussion might involve verbal, written or graphic means. Architecture schools typically refer to the process of design as occurring in a studio environment. However configured physically, the studio will be the place where design tutorials take place and where students can display and discuss their work with others. It is their base, and its existence is a major contribution to the specific and intensive qualities of architectural education.

4.2 The design project

The time allowed for a design project can vary from a single day to an academic year. During the project, the student transforms a field of inquiry into a proposition or scheme. The learning process is characterised by continual dialogue. Students learn from talking with each other and their tutors, and from the comments from other people invited to the project reviews. The most important learning experience comes from what is known in other disciplines as self-reflection, a skill central to the acquisition of all architectural knowledge and skills, and one that is consciously developed.

It is not possible, or desirable here, to be prescriptive in describing the learning process in the design project. Methods and intentions can vary considerably. But there are characteristics common to all processes in schools of architecture. Firstly, the relationship between the desire and intention to form an outcome, and its full or partial realisation, is exploratory and developmental. Secondly, students work predominantly with means which are abstracted from the intended final outcome. Thirdly, the learning and assessment processes mirror one another, and occur and develop concurrently. Through dialogue with oneself, with other students, with and among tutors, judgments concerning quality are reached by consensus.

4.3 Review of work and assessment

The continual and consensual nature of the assessment process is distinctive to architectural education. It is a considerable part of the learning process. At the end of the time allowed for the design project, each student's work typically is reviewed in a pin-up session in front of an audience of fellow students, tutors and visiting critics from inside and beyond the institution. At these sessions, the student or group of students present their proposal to the audience, who then comment on and discuss the issues that it raises and the quality of the proposal. Critical commentary may be given to students in verbal, written and graphic forms. These project assessments are then reviewed by staff and external examiners, usually in the form of a design portfolio. Other parts of the undergraduate architecture course are usually assessed through methods which are more standard to university disciplines, such as coursework, examinations, papers and project-based work.

4.4 Variety of submission

Architectural education requires many types of submission, which the student builds into a portfolio of work that demonstrates knowledge and skills across the range of the course. The types of submission include:

- review presentation of project work through graphic and three-dimensional means
- review presentation of project work through digital and electronic media
- portfolio presentation of drawings, digital work and other visual material
- three-dimensional artifacts, physical models and installations
- seminar presentations
- written examinations and coursework
- project-based work

4.5 Teaching and learning methods

In addition to more conventional methods of learning through lectures, seminars and tutorials, architectural education requires:

- visual and verbal presentation of project work at pin-up reviews or crits
- preparation and assembly of a portfolio of work
- group project work
- short design projects and workshops (typically lasting between a day and a week)
- specialist subject tutorials
- visits to investigate and / or survey a site
- visits to experience and study historical and contemporary architecture and cities
- visits to buildings in the process of construction
- environmental investigations of design project work
- model-making
- the use of computer aided design and other software
- self-directed study

5.0 Standards

This section sets out the minimum achievement that a student would be expected to have demonstrated before they are awarded an Honours degree in architecture. It is then followed by a brief description of what would be expected from a typical student. Each institution will have its own method of determining what constitutes appropriate evidence of a student's relative achievement. The external examiner system and the academic reviews established by the QAA will monitor adherence to these standards.

5.1 The threshold standard for a student in architecture will be demonstrated through their performance under the following five headings:

5.1.1 Design

The student will demonstrate:

- an ability to produce an architectural design
- an understanding of the ways that the analysis, research, development and preparation of an architectural programme or brief can inform design
- knowledge of architectural histories and theories, of physical and cultural contexts, and of the ways that they can inform design processes, programmes and proposals
- knowledge and understanding of the principles of building technologies in relation to human needs
- an understanding of the impact on architectural design of regulatory frameworks, the needs and aspirations of clients and building users, and the requirements of the wider community

5.1.2 Cultural context

The student will demonstrate:

- knowledge and understanding of the histories and theories of architecture and urban design, the history of ideas, and the related disciplines of art, cultural studies and landscape studies
- an appreciation of the influences on the contemporary built environment of individual buildings, the design of cities, past and present societies and wider global issues

5.1.3 Environments and technologies

The student will demonstrate:

- knowledge and understanding of the theories and principles of environmental technologies
- an awareness of the impact of environmental design, construction methods and architectural technology on human comfort and well-being, and how these may inform and influence design decisions
- an understanding of the relationship of environmental design, construction methods and architectural technology to the climate, the development of a sustainable environment, and the impact that design decisions may have upon the natural world and its resources
- knowledge and understanding of structural and constructional principles, the properties and meanings of materials, and the ways that they may inform and influence design decisions
- an appreciation of the impact on design of statutory instruments for health, safety and comfort, both during the construction and the occupation of a project

5.1.4 Communication

The student will demonstrate:

- an ability to use a range of graphic and modelling techniques drawn from a variety of media
- an ability to communicate architectural ideas and designs through visual, written and verbal means

5.1.5 Professional studies and management

The student will demonstrate:

- an appreciation of the issues which influence the processes and delivery of design
- an understanding of the roles and relationships of those in the construction, culture and other industries
- knowledge of the ways that regulatory and economic frameworks and systems relate to wider social and ethical concerns

5.2 Typical standard

On completion of the undergraduate course in architecture, the typical student will meet not only the threshold standards, but will also demonstrate an integration and understanding of the relationships among most of the specified headings. He or she will be expected to produce well-resolved design projects, as demonstrated through an articulate and coherent portfolio of work.

Architecture benchmark group membership

Ms A Boddington	University of Brighton
Mr D Clews	University of North London
Professor D Dunster (Chair)	University of Liverpool
Dr M Fraser	Oxford Brookes University
Professor J Low	University of Central England in Birmingham
Professor S Spier	University of Strathclyde

Academic standards - Architectural Technology

1.0 Defining principles

1.1 In its consultation paper entitled Developing the Quality Assurance and Standards Framework for UK Higher Education, the Quality Assurance Agency for Higher Education (QAA) advocates the development of 'benchmark information on subject threshold standards' which articulates the abilities and skills expected of bachelors honours graduates in different subjects.

1.2 The purpose of such information is to assist:

- higher education institutions in designing and approving programmes of study;
- external examiners and academic reviewers in verifying and comparing standards;
- where appropriate, professional bodies in their accreditation and review of programmes relating to professional competence;
- students and employers when seeking information about higher education provision.

1.3 This particular document sets out proposals for the benchmark information in architectural technology. It focuses on six major aspects concerning programmes leading to bachelor's honours degrees:

1. The defining principles within which this benchmark information for architectural technology exist
2. The nature and extent of bachelors honours degree programmes in architectural technology
3. The essential subject knowledge and understanding that may be expected to be covered in all study programmes leading to such degrees
4. The subject and transferable skills to be developed in students through the study of architectural technology at bachelors honours degree level
5. Recommendations concerning the methodologies appropriate for the teaching, learning and assessment of the subject knowledge and skills set out above
6. Standards and criteria for different levels of attainment

The specifications and criteria concerning the foregoing points, set out in the following sections of this document, are intended to provide a broad framework within which course providers can develop purposeful and challenging architectural technology programmes that respond to the needs of their students, as well as to the changing nature of architectural technology. Their purpose is not to impose on institutions a set of rigid conditions that would stifle innovation in programme development and in the design of learning experiences. However, in so far as they seek to articulate the key qualities expected of bachelors honours architectural technology students at the end of their degree programme, it is hoped that they will make a valuable contribution to the definition of 'graduateness' in architectural technology and the maintenance of the standard of architectural technology degrees.

Details of the aims, objectives and content of individual programmes will be found in the programme specifications or other documentation issued by higher education institutions.

2.0 Nature and extent of subject

2.1 The needs, aspirations and requirements of society in relation to the built environment have to be recognised, interpreted, analysed and provided. Modern design and construction frequently involves materials, techniques and concepts unfamiliar to industry and practice. These new materials and products, alternative procurement strategies and extensive service installations have made the design and construction process more complex and at the same time less dependent on craft skills. The industry also under performs and the Latham and Eagan reports have challenged the whole of the professions and industry to improve performance. In response to these challenges the discipline of Architectural Technology has seen rapid growth and continues to be the fastest growing degree provision within Built Environment Education in the UK. Courses are normally accredited by the British Institute of Architectural Technologist (BIAT) which is the lead professional body in this discipline. Architectural Technology courses are primarily based upon the twin concepts of designing for performance and production through the use and integration of technology

2.2 A useful definition for the practice of Architectural Technology is that on completion of a degree programme and with appropriate professional experience, the Architectural Technologist will be able to analyze, synthesize and evaluate, design factors in order to produce design solutions which will satisfy

performance, production and procurement criteria. This will be achieved through the design, selection and specification of materials, components and assembly and the management, coordination, communication, presentation and monitoring of solutions which perform to the agreed brief and standards in terms of time, cost and quality'

2.3 Degree programmes in **architectural technology** typically involve/consist/include:

- To instill in students a sense of enthusiasm for architectural technology, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying
- The essential position of the science and technology to the design, production and performance of building and construction;
- The value placed on detailed design and production information, including technical regulatory factors affecting buildability, sustainability and performance
- Knowledge of procurement and contract administration;
- The utilization of both knowledge and understanding of architectural technology to provide an analytical methodology in the derivation of solutions to construction related problems;
- An understanding of site investigation and diagnostic surveying;
- An understanding and appreciation of structural design and building services;
- Considering architectural technology in an technological, social, legal and economic context;
- An understanding of business and management skills including professional practice as appropriate to the profession of architectural technology.

Typical subjects might include architectural technology, site investigation, legal and regulatory framework, adaptation/conversion of buildings, physical material science, computer aided design, management, contract and project administration, graphical communication, specification and technological design.

3.0 Subject knowledge and understanding

3.1 Each institution providing bachelors honours degree programmes in architectural technology is free to decide on the content, nature and organisation of its courses or modules. Therefore, architectural technology degree programmes offered by individual institutions will have their own particular characteristics based upon the resources, strengths, scholarship and experience of its academic staff.

While it is acknowledged that the depth in which individual aspects are treated may vary with the nature of specific architectural technology programmes, it is expected that all programmes will ensure that students become conversant with the three main aspects of architectural technology listed under the following headings:

- A. Technology
- B. Design, Procedures and Practice
- C. Procurement and Contracts

Each of these subject specific skills require cognitive skills in understanding, application, analysis, synthesis and evaluation to differing extents as described under each skill.

- A. Technology

Investigation

Graduates should know how to investigate and evaluate the constructional and contextual factors in a given project, identifying likely problems and devising appropriate technical solutions. Graduates should also be able to plan and detail the requirements, together with the data standards involved and interpret the outcomes data analysis. The graduate should be able to observe, record and examine diagnostic investigation information.

Principal cognitive abilities required: Understanding, application, analysis and synthesis plus practical skills.

Investigate design, construction and development factors.

Graduates should know how to distinguish and analyse significant construction, development and technical design factors (construction methods, structure, environment and services), including the scientific principles

on which these are founded and appropriate practical skills. Graduates should also have a knowledge of the relevant physical and scientific processes and principles applied to construction and apply these to the behaviour and properties of building materials.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Specifications

Graduates should have gained experience in the preparation of prescriptive and performance specifications. Graduates should have the knowledge and understanding to implement technical design solutions through the selection and specification of materials, methods of production, client and user requirements and performance in use.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Quality Control

Graduates should know how to discern quality requirements and control technical conformance of materials and construction work.

Principle cognitive abilities required: Understanding, application, analysis and synthesis.

Performance in use

Graduates should be able to identify maintenance requirements and develop owner's manuals for property, systems and services. There should also be the ability to initiate and evaluate feedback studies and other audits (eg access and whole life-cycle costing).

Principle cognitive abilities required: Understanding, application, analysis and synthesis.

Recommend and advise on the selection of a project technical design

Upon the completion of a degree course, graduates should be capable of advising clients on the selection and modification of a technical design recommendation. Graduates should be able to negotiate and agree a detailed design and should demonstrate knowledge and understanding of identifying purpose, methods and techniques for preparing technical designs.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Monitor construction requirements

Graduates should have an understanding of the contribution of architectural technologists and other professionals to the monitoring and quality control processes of projects and be able to initiate and co-ordinate such processes.

Principle cognitive abilities required: Understanding, application, analysis and synthesis plus practical skills.

B. Design, procedures and practice

Develop and test technical design solutions

In professional practice, an architectural technologist will have to identify and assess the significant technological factors affecting design. Therefore, during the course of their undergraduate programme they will be expected to encounter situations where they would have to select, test and refine existing and new technical design solutions.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Technical regulatory factors affecting project design

The degree should equip graduates with the knowledge to be able to identify, confirm and apply technical regulatory and legal requirements and constraints for a given design. Graduates should be aware of, and be able to, report and advise on potential technical options which comply with the appropriate regulatory requirements.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Detailed design and production Information

Includes analysis (internal/external environments, structure, fabric, services, rehabilitation, adaptation, conversion), selection (construction methods, materials), calculations, production drawings (manual and CAD), schedules and design cost control. This should be underpinned by a knowledge and understanding of appropriate

scientific and theoretical concepts and an appreciation of cost-effectiveness in the use of design solutions.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Design procedures

Graduates in architectural technology should demonstrate knowledge and understanding of design methods, and processes, the basic principles of architectural composition, and an appreciation of contemporary design solutions.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Selection of a project technical design

At the completion of a degree course, graduates should be able to prepare and present technical design recommendations. They will also be capable of investigating client and user requirements and advising clients on the suitability, selection and modification of a technical design recommendation. Graduates should be able to negotiate and agree a detailed design.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Design proposals

Graduates should know how to prepare and present design proposals to project teams, clients, users and other parties. There should also be the ability to distinguish and assess aspects of projects requiring detailed design, specify design document requirements and establish consistency between them.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Planning work carried out by teams, individuals and self

Graduates should be able to contribute to the management and organisation of design information particularly in the area of production information. They should have an ability to identify and confirm design team roles and responsibilities and appraise design team methods as well as to set and update work objectives for teams and individuals. The graduate should have an understanding of how to plan activities and determine work methods to achieve objectives.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Organising information

The derivation and evaluation of information to aid decision-making is a skill, which ought to be reflected in the course content. Graduates should recognise the importance of, and put into practice the recording and storage of information and be able to contribute to the development of such systems.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Information exchange and retrieval

Graduates should be able to contribute to meetings and group discussions in order to solve problems, make decisions, take responsibility and take actions. The degree should contain suitable opportunities to become aware of and develop the skills required for this, as well as those needed to advise and inform other professionals in the construction team and the client(s).

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Business and management

A graduate should be able to demonstrate skills in business and management and should be able to ascertain and examine management structure, business techniques and operations as well organisational procedures and management styles.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Professional practice

Graduates should be able to act appropriately as a professional architectural technologist operating within a practice offering services directly to the public and have the ability to summarise problems, apply judgement techniques, offer balanced advice and protect client interest as well as establish and maintain personal competence needs and methods of support.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

C. Procurement and contracts

Procurement methods and techniques

There should be a knowledge of the construction industry, the roles of the professional within it and their relationships leading to the procurement of suitable professional services. They should also have a knowledge of and an ability to review different procurement methods with a view to selection and perform post procurement evaluation.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Procedures for project tenders and bids

Graduates should be able to clarify procedures for submitting tenders and bids and contribute to their development and submission as well as an ability to evaluate post bid feedback.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Contract administration

The graduate should have a knowledge of the basic forms of contract in use and their limitations and use this to assess and select appropriate contract types as well as evaluate feedback. This should be based upon an critical knowledge of the English/Scottish legal system and the other forms of legislation controlling the built environment. Graduates should also know how to confirm, certify and monitor the cost and progress conformance of contracts.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

Health and safety within the construction industry

The graduate should have a knowledge of the principal health and safety legislation affecting the construction industry in terms of (but not limited to) property, systems and services and be able to apply these to projects as appropriate and necessary.

Principle cognitive abilities required: Understanding, application, analysis and evaluation.

4.0 Subject skills and other skills

4.1 At bachelors Honours level, students are expected to develop a wide range of different abilities and skills. These may be divided into three broad categories, viz.:

- a. Architectural technology related cognitive abilities and skills, i.e., abilities and skills relating to intellectual tasks, including problem solving;
- b. Architectural technology practical skills, eg, skills relating to drawing and CAD studios
- c. Key skills that may be developed in the context of architectural technology and are of a general nature and applicable in many other contexts

The main abilities and skills that students are expected to have developed by the end of their bachelor's Honours degree programme in architectural technology, are as follows: -

- a. Architectural technology cognitive abilities
 - Ability to demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to the subject area
 - Ability to develop creative and innovative solutions
 - Awareness of the provisional nature of knowledge
 - Ability to make informed judgements based on evidence
 - Ability to apply such knowledge and understanding to the solution of qualitative and quantitative problems of a familiar and unfamiliar nature
 - Able to question current theories and practice
 - Ability to recognise and analyse novel problems and plan strategies for their solution
 - Skills in the evaluation, interpretation and synthesis of technological information and data
 - Ability to recognise and implement good practice

- Skills in presenting architectural technology information and arguments clearly and correctly, in writing, drawing, and verbally, to a range of audiences
- b. Architectural technology practical skills
- Ability to use information technology independently to support previously identified cognitive abilities and skills
 - Ability to produce quality architectural presentations through various media, including drawings, sketches, schedules, calculations, photography, models, and CAD
- c. Key skills

Key skills are the general skills that can help architectural technology graduates to improve their own learning and performance. In a world that requires people to respond to and anticipate change, these skills are essential to remaining employable. They can help graduates to be flexible in future work. They are relevant to all levels of an organisation, as well as to self-employment, further study and life outside of work.

There are six key skills appropriate to architectural technology and a graduate achieving a threshold benchmark would have to achieve each key skill, namely;

- communication;
- application of number;
- information technology;
- working with others;
- improving own learning and performance;
- problem solving.

To achieve a key skill, a graduate must demonstrate the ability to:

- develop a strategy for using the relevant key skill over an extended period of time, and plan how this will be achieved;
- monitor progress, critically reflect on your performance in using the relevant skill, and adapt their strategy, as necessary, to achieve the quality of outcomes required;
- evaluate their overall strategy and present the outcomes from their work, including ways of further improving their skills.

These can be applied to each key skill:

1. *Communication*

- develop a strategy for using a variety of oral, visual and written forms of communication
- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

2. *Application of number*

- develop a strategy for using a variety of skills in application of number
- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

3. *Information technology*

- develop a strategy for using a variety of IT skills
- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

4. *Working with others*

- develop a strategy for using a variety of skills in working with others

- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

5. *Improving own learning and performance*

- develop a strategy for using a variety of skills in Improving own learning and performance
- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

6. *Problem solving*

- develop a strategy for using a variety of skills in problem solving
- monitor and critically reflect on progress
- evaluate your overall strategy and present outcomes from the work

5.0 *Teaching, learning and assessment*

5.1 Academic challenge

Teaching and learning strategies will normally relate to the subject studied, should have the focus on an active and reflective learner and also ensure that it provides an appropriate honours degree experience.

Students should have the opportunity to carry out an extensive piece of work, which allows them to synthesise the many techniques introduced in their programme of study. Extended projects permit the development of many of the general skills that the graduate may be expected to have. Included in this are: the planning and management of their own work over an extended period of time; meeting deadlines and working within other externally defined constraints; tackling work which lacks a well-defined outcome or which has a wide range of possible answers; opportunities to be creative; putting technical work in a social and economic context; presentation of information in various ways; searching published sources of information; applying knowledge to unfamiliar problems. Project work is an excellent opportunity for both individual effort and teamwork and in some programmes, the teams may be multi-disciplinary. Some departments prefer to offer alternatives to the extended project, such as more, smaller projects: where this is the case, departments should demonstrate that the objectives listed above are being met.

5.2 Learning experience

The nature of the delivery of each programme will depend upon its aims and learning outcomes, the student population and the HEI. Learning and Teaching methods are developed to meet these needs and must ensure that this development is not inhibited by over-prescriptive guidance. However, there are some elements which it is felt should be part of the student experience. All students would be aware of the aims and learning outcomes of the degree programme, the assessment regulations and strategy, and the learning outcomes of the modules or subjects studied. There should be some formal contact with staff teaching on the programme in structured settings, and this may be through a variety of different experiences, such as lectures, seminars, tutorials, practical sessions, design classes and workshop sessions. This formal contact provides a broad framework for the programme, introducing students to the underlying principles and concepts central to the discipline. At their best such experiences offer an interpretation and perspective on the core material within each subject, whilst covering the applications of particular theoretical and analytical tools. Lectures will be more appropriate to certain kinds of subjects than others and it is for programme teams to decide on their optimum deployment.

Seminars and tutorials offer students the opportunity to practice the analytical and theoretical skills which have been introduced in lectures, and to deal with a wide range of applications. Design classes provide an opportunity to undertake design case studies as well as stimulating thought through open-ended problems. Practical laboratory based sessions allow students to carry out experimental work which supports the theoretical material presented in lectures. This enables the student to gain an understanding of the limitations and assumptions used in theoretical and modeling tools. Other practical sessions might include workshop sessions for some aspects of Practice and CAD where students use software and tools to analyse problems and design solutions.

5.3 Assessment

An implication of the benchmarking of honours degrees is that, normally, all students graduating with such a degree will meet at least the threshold standards in every component of the benchmark. This will necessitate a review of assessment strategy in many cases.

Assessment is the means by which students are measured against benchmark criteria and should also form a constructive part of the learning process. There is a danger that the large number of performance statements which need to be tested may lead to a very mechanistic, "check list" approach together with complex regulations indicating which modules must be passed prior to progression. This is neither necessary nor desirable; indeed it is important to take a strategic, whole course approach so that assessment is appropriate, based on sampling and does not increase in quantity. In developing an assessment strategy some key factors should be considered:

- There must be sufficient clearly identified opportunities for students to demonstrate that they have met the threshold in all components of the benchmark;
- Achievement of threshold standards may, in some cases, be implicit in the learning process;
- Achievement of threshold standards should be possible without an individual student being required to pass all assessments;
- Careful selection from a wide range of assessment methods can make the process more efficient and effective;
- It is important that the strategy provides sufficient opportunity for the best students to exhibit the level of innovation and creativity associated with excellent.

Clearly many students will exceed the threshold levels in a number of the benchmark components and it follows that a profile of performance will emerge. It is assumed that Higher Education Institutions will continue to determine the overall performance of students according to the conventional classification process. It will therefore be necessary for individual HEIs to develop a procedure to map their award and classification regulations for the range of degrees onto the benchmark performance profile.

Assessment procedures

It is essential that the procedures used for the assessment of students' achievement should correspond to the knowledge, abilities and skills that are to be developed through their degree programme.

Evidence on which the assessment of student achievement is based, should include:

- Formal examinations
- Laboratory reports
- Problem-solving exercises
- Oral presentations
- Planning, conduct and reporting of project work
- Additional evidence of use for the assessment of student achievement may be derived from:
 - Essay assignments
 - Portfolios of activities undertaken
 - Literature surveys and evaluations
 - Collaborative project work
 - Preparation and displays of "posters" reporting project work
 - Reports on external placements (where appropriate)

Performance criteria

Although all students graduating at bachelors honours level are expected to demonstrate that they have acquired knowledge, abilities and skills in the areas identified in the foregoing sections, it is accepted that there will be significant differences in their attainment. The following criteria are suggested as indicators of different levels of attainment in these areas. The individual levels of attainment in the separate performance areas should guide examiners in the overall evaluation of individual students.

Attainment level A (highest): First class honours

- Knowledge base is extensive and extends well beyond the work covered in the programme. Conceptual understanding is outstanding
- Problems of a familiar and unfamiliar nature are solved with efficiency and accuracy; problem-solving procedures are adjusted to the nature of the problem
- Skills are exemplary and show a thorough analysis and appraisal of results, with appropriate suggestions for improvements
- Performance in transferable skills is generally very good

Attainment level B: Upper second

- Knowledge base covers all essential aspects of subject matter dealt with in the programme and shows some evidence of enquiry beyond this. Conceptual understanding is good
- Problems of a familiar and unfamiliar nature are solved in a logical manner; solutions are generally correct or acceptable
- Skills work is carried out in a reliable and efficient manner
- Performance in transferable skills is sound and shows no significant deficiencies

Attainment level C: Lower second

- Knowledge base is sound, but is largely confined to the content of the programme. Level of conceptual understanding is generally sound
- Problem-solving ability is sound in relation to problems of a familiar type or those that can be tackled through the straightforward application of standard procedures and/or algorithms
- Skills work is generally satisfactory and reliable
- Performance in transferable skills is largely sound

Attainment level D: Third class

- Knowledge and understanding of the content covered in the course are basic
- Problems of a routine nature are generally adequately solved
- Skills are usually carried out with reasonable success though significance and limitations of results may not be fully recognised
- Transferable skills are at a basic level

Attainment level E (lowest): Pass degree

- Knowledge base is acceptable in relation to some of the content covered in the programme
- Problem-solving ability extends to simple "standard" problems, following routine procedures
- Skills are rudimentary
- Transferable skills are rudimentary

6. Benchmark standards

Threshold standard	Average standard	Excellent standard
Identify, collate and present findings on construction and development factors (construction methods, structure, environment and services)	Analyse findings on construction and development factors (construction methods, structure, environment and services)	Evaluate critical construction and development factors (construction methods, structure, environment and services)
Distinguish significant technical design factors (construction methods, structure, environment and services)	Collate and test technical design factors (construction methods, structure, environment and services)	Assess, analyse and develop technical design parameters
Determine the relative importance of construction and installation criteria significant to the selection of materials, components and systems	Investigate, analyse and assess construction and installation criteria significant to the selection of materials, components and systems	Evaluate and select materials, components and systems
Distinguish the significance of technical factors and design selection criteria	Calculate and develop detailed design solutions	Analyse, test and resolve conflicts between technical design requirements
Distinguish appropriate methods of construction and installation	Analyse work methods against project requirements	Evaluate work methods against technical and project criteria
Determine technical design performance requirements (construction methods, structure, environment and services)	Produce technical prescriptive specifications	Analyse and define technical performance specifications
Discern quality standards and control systems	Confirm technical conformance of materials and construction work	Develop quality control systems
Distinguish performance in use requirements	Assess performance in use criteria	Synthesise performance findings and identify improvements
Establish the purpose and methods for diagnostic investigation and survey	Observe, record and examine diagnostic investigation information	Analyse diagnostic information and identify causes of failure and remedies
Design procedures and practice		
Establish client and user requirements	Investigate and analyse client and user requirements	Challenge client and user requirements
Confirm project technical briefs	Analyse project technical briefs and projected costs	Develop technical design programmes
Identify design services, resources and contractual arrangements	Confirm design team roles and responsibilities	Evaluate design team provision composition
Clarify design team working methods	Appraise design team working methods	Evaluate design team working methods
Determine survey needs, accuracy and outputs	Conduct and record measured surveys	Assess and analyse survey data

Collect and classify technical information	Organise the use of technical information	Control the use of technical information
Identify and confirm regulatory requirements and constraints	Apply regulatory requirements and constraints to projects	Assess the impact of regulatory requirements and constraints on projects
Identify and confirm legal requirements and constraints	Investigate legal requirements and constraints	Assess the impact of legal requirements and constraints
Prepare and present design proposals	Identify implications of design proposals	Justify design recommendations
Distinguish aspects of projects requiring detailed design	Provide information to agree detailed designs	Assess implications of detailed design recommendations
Specify design document requirements and establish consistency between them	Collate and check production information	Assess and evaluate production documents
Distinguish standard conventions for preparing drawings and schedules	Produce drawings and schedules for different purposes	Select methods and media for different types of drawings and schedules
Discern maintenance information for property, systems and services	Produce guidance for maintenance of property, systems and services	Specify requirements for maintenance of property, systems and services
Ascertain management structures and organisational operations	Examine strategies and styles of management	Evaluate the management of organisations
Establish the purposes, objectives, procedures, roles and responsibilities for meetings	Follow meeting procedures	Manage meetings to achieve objectives
Identify problems, their causes and criteria for solutions	Summarise problems and apply judgement techniques	Analyse and interpret problems and test perceptions
Communicate with clients and identify conflict of interest	Offer balanced advice and protect client interests	Make balanced judgements
Establish competence needs and sources of support	Record profiles of competence needs and progress	Analyse personal development aims and plans
<i>Procurement and contracts</i>		
Ascertain procurement requirements	Review relative importance and risk of procurement methods	Evaluate and select appropriate procurement methods
Clarify tender and bid procedures	Examine tender and bid information and follow procedures	Evaluate and process tenders and bids
Distinguish purposes, types and obligations within contracts	Review relative importance and risk of contract types	Evaluate and select appropriate contract types
Establish cost and progress requirements of contracts	Confirm and certify cost and progress conformance of contracts	Develop contract monitoring systems

Architectural technology benchmark group membership

Professor SJ Allwinkle	Napier University
Dr EA Brookfield	British Institute of Architectural Technologists
Mr DRS Cracknell	Construction Industry Council
Mr TJ Law	Trevor Law (Private Practitioner)
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Landscape Architecture

supplement to
Academic Standards for
Architecture, Architectural
Technology and Landscape
Architecture

Foreword

The subject benchmark group for Architecture, Architectural Technology and Landscape Architecture consisted of members representing each of the subjects within Higher Education in the UK.

The group met as a whole initially to address the benchmark issues. However, the deliberations on the form and content of benchmarking statements for these three subject areas were carried out independently by respective specialist subgroups. This form of working was supported by QAA.

The three subgroups produced separate benchmark statements for Architecture, Architectural Technology and Landscape Architecture.

The reasons for such separation are the different aims, structures and content of undergraduate provision in each of the subjects.

The Landscape Architecture statement forms a supplement to the main Architecture, Architectural Technology and Landscape Architecture publication.

May 2000

Academic standards - Landscape Architecture

1.0 Defining principles

This benchmark is concerned with first degrees in Landscape Architecture. The majority of these currently offer exemption from what were formerly Parts I-III of the Landscape Institute's examinations for professional qualification. In addition to these existing or aspiring 'accredited' courses there are various others that offer some aspects of the discipline of Landscape Architecture in combination with other subjects or with emphases that are not specifically 'professionally' orientated.

In delineating the boundaries of the discipline for this benchmark we have, therefore, sought to acknowledge a diversity of both intellectual scope and educational provision. It is expected that individual institutions will situate themselves within this diverse territory and not approach this benchmark as a curriculum.

Following the establishment of professional bodies in the 19th century in response to the scale of industrial development and a need to regulate standards of competence and probity, the Institute of Landscape Architects (ILA) was formed in 1929. As with architecture, the system of education in the discipline was generally *ad hoc*, with practitioners coming from backgrounds as varied as architecture, planning, parks management and horticulture amongst others. Entry to the ILA was by external examination in four parts and election. The 1960s saw the emergence of courses in Landscape Architecture in British higher education. These courses typically were of four years' duration leading to the award of a Graduate Diploma (although postgraduate 'conversion' courses were also introduced at this time). By the 1970s, successful completion of such courses was being accredited by the ILA as exempting students from the first three parts of the professional examinations. Subsequently, courses were split into three year honours degree courses followed by a one year diploma with a 'year-out' in practice generally taken between them. Full professional membership of the Institute requires a further two years monitored work in practice and the passing of written and oral professional practice examinations.

A significant change to the profession took place in 1979 when in recognition of the scope of work undertaken and the holistic nature of the processes involving change in the landscape, the ILA incorporated separate membership divisions for Landscape Managers and Scientists and renamed itself the Landscape Institute (LI) This is the position that currently obtains with the recent granting of a Royal Charter to the Landscape Institute confirming the tripartite nature of Landscape Architecture with Design, Management and Science Divisions of membership.

Considerable discussion has taken place between the Standing Committee of Heads of Landscape Architecture Schools (SCHOLA) and QAA as to where Landscape Architecture should be located for the purposes of Academic Review. The diversity of the discipline and current provision at honours degree level means that neither the Architecture or Town and Country Planning areas alone were felt to be appropriate for all courses. Consequently, this benchmark has been written on the assumption that individual institutions will determine and declare within which particular Academic Review area their provision will be 'located' for review purposes.

In producing this benchmark for Landscape Architecture, a number of starting points formed the basis for deliberations. These are the European Foundation for Landscape Architecture's statement on Education in Europe (1998), the Definition and Scope of Landscape Architecture in the Royal Charter (1997), the Guidance Notes for Schools seeking accreditation of courses produced by the Landscape Institute, the Dearing Report on Higher Education (1997) and the Report of the Urban Task Force (1999).

Published QAA benchmark statements for other subject areas such as Architecture and Earth Science, Environmental Science and Environmental Studies which closely relate to Landscape Architecture have also been consulted in this process.

2.0 Nature and extent of the subject

2.1 Scope

Landscape Architecture as a discipline embraces all aspects of the science, planning, design, creation and management of landscape, in both urban and rural environments, and at all scales, from the smallest garden to the greatest wilderness. It may be concerned with creating new landscapes, or with sustaining existing ones. The emphasis is on promoting landscapes that are aesthetically pleasing, functionally appropriate and ecologically healthy, while at the same time being able to accommodate the diverse and changing needs of society, within an overall context of sustainability.

It is, therefore, a rich and diverse subject which is both interdisciplinary and multidisciplinary in nature, and which draws on the traditions of both the arts and the sciences. As a profession Landscape Architecture is now defined as falling into three main divisions - Landscape Design, Landscape Management and Landscape Science - while a fourth, Landscape Planning is also emerging as an additional focus. The three existing professional divisions may be defined as follows:

Landscape Design is concerned with the planning and design of all types of outdoor places. It uses design techniques that require knowledge of the functional and aesthetic characteristics of landscape processes, materials and understanding of the ways that landscape spaces and elements can be organised to meet aesthetic, functional, ecological and user requirements. It may operate at a variety of scales from the design of small individual sites to large-scale master planning and landscape planning. The work includes research and surveys, analysis and assessment and the preparation of concepts and strategies, master plans and detailed designs. It also involves the development of specifications and contract documents and the letting and supervision of contracts so that designs can be realised. For the purposes of benchmarking Garden Design is most closely allied to Landscape Design. It shares a substantial part of the skills and knowledge base but with a focus on a smaller scale and detailed design.

Landscape Management is concerned with the long-term care and development of new and existing landscapes and also with determining policy and planning for future landscape management and use. It requires particular expertise in the management and maintenance of landscape materials, both hard and soft, based on established principles of construction, horticulture and ecology. Understanding of budgetary control matters, management skills and contract administration are also involved.

Landscape Science is concerned with understanding of the principles and processes of natural biological and physical systems and application of this understanding to the solution of practical landscape problems across the spectrum of design, planning and management. Work may involve environmental impact analysis issues relating to pollution and contaminated land, and the creation of new habitats relating to new land uses. Ecological and habitat surveys, and the preparation and appraisal of conservation schemes are common tasks in this area, but Landscape Science is in itself a highly varied subject.

2.2 Range of courses

The breadth and diversity of Landscape Architecture as a subject is reflected in the diversity of Landscape Architecture education. There are a total of 12 courses which have been professionally accredited by the Landscape Institute as either Landscape Design, Landscape Management or Landscape Science courses or indeed some combination of these. These accredited courses provide entry to the Landscape Institute as a graduate (Associate) member at a level equivalent to the former Part Three professional examination.

Each course is guided by the Landscape Institute's advice on course content but determines its own individual identity and focus within the broad spectrum of subject matter that is embraced by Landscape Architecture. While courses may be designed to prepare students specifically for entry to one of the Institute's divisions of Landscape Design, Landscape Management and Landscape Science, each will also seek to develop students appreciation of the full breadth of Landscape Architecture. So, for example, a Landscape Design course will seek to ensure an appreciation of the nature and roles of Landscape Management and Landscape Science. Similarly a Landscape Management or Science course will ensure appreciation of the nature and role of design activity in the profession.

While many professionally accredited courses concentrate wholly on Landscape Architecture, it is also recognised that in an increasingly interdisciplinary work environment the subject can usefully be combined with other professional and academic disciplines in joint or dual degree programmes. Where it is intended that students will proceed to practise professionally in the discipline it is generally accepted by the Landscape Institute that there will be a minimum of 50% of Landscape Architecture content within such programmes.

In addition to the professionally accredited courses there is also a wide range of other provision for undergraduate education in the field of Landscape Architecture in a diverse range of non-accredited programmes. These may embrace a great range of subjects including garden design, landscape construction, landscape management, landscape planning and a great variety of other subjects under the broad heading of Landscape Studies. Some of these courses may have a more academic emphasis, while others are of a more practical and applied nature.

2.3 Student entry

Students tend to come to Landscape Architecture education from a wide variety of backgrounds, thus contributing to the diversity of the discipline and helping to give each school and programme its own characteristic flavour. Students wishing to pursue courses with a design emphasis may arrive with a greater interest and capability in the creative arts, while those wishing to pursue courses in Landscape Management or Science may have a more scientific background. The wide-ranging nature of the courses, whatever their main emphasis, does, however, demand flexibility and an ability to work across traditional disciplinary boundaries and this, perhaps more than anything else, characterises successful students in this field. While many students enter courses as a route into the Landscape Architecture profession, undergraduate degrees in the subject also equip students with a wide range of transferable knowledge and skills. These can allow graduates to go on and work in a number of fields, including other environmental areas and professions as well as types of work which have no environmental emphasis.

3.0 Knowledge, skills and understanding

Landscape Architecture brings to bear a wide range of knowledge, understanding and skills in a complex iterative process involving research, reflection and the synthesis of subject-based knowledge. The object is to apply this to specific project work. There is a common core of skills, knowledge and understanding that applies to and is found in all courses in Landscape Architecture and a range that is either specific to or more heavily emphasised in a course depending on whether it is focused on Landscape Design, Landscape Management or Landscape Science. This section deals first with elements common to all courses and then identifies those specific to each type of course.

3.1 Physical and natural environment

Students of all courses will typically demonstrate knowledge and understanding of the physical and natural systems and processes which shape the landscape and the skills to analyse and apply such knowledge and understanding appropriately in the context of planning, design and management decisions.

3.2 Social economic and cultural context

Human interaction with the environment is a key component of the distinctive nature of Landscape Architecture. Students will typically acquire knowledge and understanding of the complex range of social economic and cultural influences which contribute to the evolution of landscapes in time and space. Courses generally seek to cultivate skills in critical analysis, evaluation, judgement and reflection which enable them to examine the role and importance of these influences in past and present landscapes and in the creation of sustainable landscapes for the future.

3.3 Professional context

Landscape Architecture is practised in a professional context and the fundamental aspects of this and the skills and knowledge that underpin it will be an element in all courses. This will typically involve an appreciation of the role of a range of professions relevant to the landscape and environment as well as an understanding of the growing importance of the interdisciplinary nature of this work; the significance of values and ethics; the nature and purpose of regulatory frameworks; and the relationship of professional groups to a range of other communities and stakeholders in society.

3.4 Landscape technology

All courses will focus on a wide range of technologies appropriate to Landscape Architecture. This will involve understanding of the nature, characteristics and performance of materials and processes that will be both inorganic and organic ('hard' and 'soft' technologies) and the principles and methods employed in their selection, use and application in the creation and management of landscapes.

3.5 Transferable skills

Courses in Landscape Architecture enable students to develop a wide range of transferable skills including:

- effective communication using written, oral and graphic skills in a variety of media and the appropriate deployment of these to present, exchange and review ideas, theories, findings, conclusions and proposals;
- self management, personal reflection, study and learning skills;
- time and project management skills;

- skills and abilities in creative and critical thinking and analysis, and in problem definitions and solution;
- interpersonal and group working skills.

3.6 Specific skills, knowledge and understanding

In addition to these common skills, knowledge and understanding, Landscape Architecture courses will display a range of characteristics that are specific to the particular nature of each course be it design, management or science focused.

3.7 Landscape Design

Landscape Design involves exploration, creativity, analysis and synthesis, and brings to bear a wide spectrum of knowledge, understanding and skills on design projects. It involves integration of subject specific knowledge and understanding of spatial form and organisation in the development of design and planning proposals.

Those courses that are identified as Landscape Design or Landscape Architecture will typically equip students with a range of skills, knowledge and understanding that will include the following:

- an understanding of the applications of design and planning theories and methodologies appropriate to a range of design contexts;
- knowledge and understanding of landscape history and contemporary design influences;
- an understanding of the relationships between design and the cultural, economic and social processes and contexts in which it exists;
- the ability to synthesise information and knowledge to plan and create appropriate design solutions;
- familiarity with the constructional characteristics of existing landscapes and a recognition of the skills required for their care, conservation or reuse and the way in which these relate to natural processes;
- abilities in the generation, development and application of three-dimensional form to landscape design work;
- knowledge and understanding of the technical consequences of design decisions and the ability to employ landscape technologies in realistic designs;
- appreciation of the consequences of design decisions on natural systems and the interrelationships between them;
- ability to appropriately communicate design thinking and solutions through a range of media to a diverse range of recipients.

3.8 Landscape Management

Landscape Management involves the understanding and application of management methods to landscape projects. It brings to bear a range of skills, knowledge and understanding in an integrated way to plan for short and long term development and management of new and existing landscapes.

Those courses that are defined as Landscape Management will typically equip students with a range of skills, knowledge and understanding that will include the following:

- a detailed understanding of natural systems which underlie both the natural and man-made landscape;
- understanding of management methods for long term care and development of new and existing landscapes;
- knowledge and appreciation of policies and planning for the future landscape management and use of a variety of sites and landscape types;
- understanding of the use and maintenance of hard and soft landscape materials reflecting appropriate constructional, horticultural and ecological principles;
- skill and ability in the preparation of management plans for the establishment and management of existing, restored and newly created landscapes;

3.9 Landscape Science

Landscape Science involves an understanding and application of scientific methods to landscape projects. It includes natural science methodologies and skills involved in hypothesis, survey, sampling, statistical analysis, predication of change, proof of hypothesis and modelling of systems.

Those courses that are defined as Landscape Science will typically equip students with a range of skills, knowledge and understanding that will include the following:

- a sound knowledge and understanding of the nature of the physical environment and its elements and processes;
- an understanding of ecological principles and ecosystem dynamics and how to relate this to specific landscape sites;
- an understanding of applied ecology techniques including research and the monitoring, recording and mapping of communities and habitats, and bioengineering techniques appropriate to particular landscape sites and projects;
- an understanding of the historical, cultural and political context in which particular landscapes have developed and the design principles by which past and future landscape design proposals or understanding of landscape and environmental assessment, pollution control and environmental protection and how these relate to landscape conservation, management and development.

4.0 Teaching, learning and assessment

4.1 Teaching and learning

The methods of and contexts for learning in Landscape Architecture education are varied depending on whether the course falls within the Design, Management or Science areas. All courses employ the usual learning methods of lectures, seminars and tutorials by which to impart key concepts, technical knowledge and transferable skills. All courses also focus on the application of these skills and knowledge to actual projects or interactions in the environment. Consequently, all Landscape Architecture students learn from the outset to synthesise a range of information, interpretations, facts and potential approaches from a range of more common academic disciplines in relation to their own engagement with problems and opportunities in the natural and built environment.

Landscape Design courses are specifically characterised by the key focus on the activities of planning and designing and the vehicle of the design project. This core activity is typically taught via individual tutorials, public and semi-public presentations (usually referred to as project 'crits') and the self-reflective and critical discussions undertaken informally by students working together in what is usually referred to as a 'studio environment'. This is the vital base for design work and, therefore, a key element in teaching and learning.

Landscape Management and Landscape Science courses do not have this key focus on the design project and the design studio as a means of teaching and learning. They are, nevertheless, strongly characterised by learning that reinforces the applications of scientific, technical and professional aspects of the subject to projects that exemplify specific opportunities for scientific investigation, analysis, monitoring and the establishment and management of existing, restored and new landscapes.

4.2 Assessment

The continuous nature of the assessment process is a distinctive characteristic of Landscape Architecture education and an important part of the learning process. This is particularly the case in Landscape Design courses where interim and final reviews of work before various audiences frequently take place. Comment on work may take various forms that reflect the various means (verbal and graphic) by which the project is represented. Other aspects of assessment of Landscape Architecture courses are typically carried out by methods familiar in other disciplines such as examinations, seminar papers, reports, dissertations, essays and so forth.

Generally, students will have the opportunity to carry out some extensive pieces of work which will allow them to synthesise the range of skills, knowledge and understandings and produce a comprehensive proposal or degree of conclusiveness. This type of work assists in the development of transferable personal skills such as time management and working within constraints; tackling work which lacks a well-defined outcome or to which there are numerous possible approaches; researching and evaluating a complex range of extant information and the application of knowledge to new and unfamiliar sets of circumstances. The development of team and group working can also form an element of this type of work.

5.0 Standards

The assumption in the process of benchmarking Landscape Architecture honours degrees is that all students graduating will be able to demonstrate that they meet the threshold standard in all those areas defined as being key to the discipline. These are indicated in section 3 above.

5.1 Overall strategy

The assessment process is both a means whereby the actual achievement and standards of students is 'measured' but also a vital part of the learning process and the development of student potential. Particularly in disciplines that are characterised by the often innovative applications of skills and knowledge to complex problems and opportunities to which there are no 'answers', it is important that the benchmarking process does not become a mechanistic 'check list' against which the varying provision and approaches present in different courses can be 'ticked off'. It is both expected and desirable that each course takes a strategic approach to assessment that reflects both these benchmarks and the content, focus and delivery of that course. Such a strategy might have regard to the following factors:

- there must be sufficient identified opportunities for students to demonstrate that they have met the threshold in all aspects of the benchmark;
- it should be possible for students to pass threshold standards whilst not necessarily passing all pieces of assessment;
- a wide range of assessment methods should be used appropriate to Landscape Design, Management or Science;
- the assessment strategy should provide sufficient opportunities for the best students to exhibit the level of innovation and creativity associated with excellence.

5.2 Levels of achievement

It is assumed that numerous students will exceed threshold standards in various aspects of their work such that a range of achievement will characterise different cohorts. The benchmarks identify 'Threshold', 'Typical' and 'Excellent' performance. Individual institutions will need to relate these to the conventional classifications of awards at honours level.

5.3 Types of submissions

Landscape Architecture work will be characterised by a range of many types of submission. It is assumed that the range of these from graphic, digital, three-dimensional visual material through conventional reports and papers to scientific experiment will be selected by individual institutions as appropriate to Landscape Design, Management and Science courses.

5.4 Performance criteria

5.4.1 Excellent standard

- Knowledge base is extensive and extends well beyond the work covered in the programme.
- Conceptual understanding is excellent.
- Problems and opportunities of a familiar and unfamiliar nature are responded to with a high level of creativity and innovation. Problem solving approaches are flexible and responsive to circumstances.
- Skills are exemplary and show a thorough analysis, appraisal and understanding of their application to a range of differing situations.
- Ability in transferable skills is generally excellent.

5.4.2 Typical standard

- Knowledge base covers all aspects of the course and, at the higher end of the standard, evidence of enquiry and understanding beyond this. Conceptual understanding will range from sound to very good.
- Problems of a familiar and unfamiliar nature are responded to with a good level of creativity and logic. Problem solving approaches are generally sound.

- Skills are demonstrated to be from sound to good in their application.
- Ability in transferable skills is sound and without significant deficiencies.

5.4.3 Threshold standard

- Knowledge and understanding of course content are basic but without significant omissions.
- Problems of a familiar and routine nature are responded to adequately but with limitations in terms of creativity, analysis and reflection.
- Skills are demonstrated to be of a competent standard.
- Transferable skills are competent but basic.

Landscape Architecture benchmark group membership

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Mr M Cowell (Convenor)	Cheltenham and Gloucester College of Higher Education
Ms C Delage	University of Greenwich
Professor C Swanwick	University of Sheffield
Mr A Taylor	Leeds Metropolitan University
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